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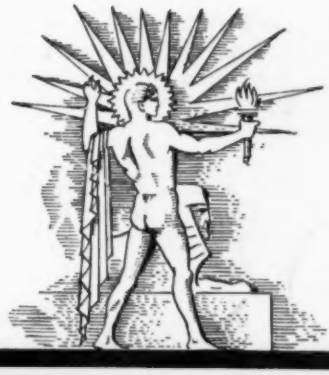
# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



January 25, 1941

## More Winter?

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A SCIENCE SERVICE PUBLICATION

# Do You Know?

The European *hart's-tongue* fern has mysteriously become naturalized in only one small spot in the United States, on a Maryland farm.

A graduate student from India has spent two years at the University of California to prepare for building a *cyclotron* in Calcutta.

*Eggs* are often a luxury in time of stress, because a hen requires three times as much feed as a cow to produce the same amount of food.

A report from Norway says that it takes eight times as much dressing material for *wounds* caused by bombs as for a similar number of industrial wounds.

A home economist says that strong cooking *odors* from onions, cabbage and cauliflower are often caused by too long cooking at boiling heat — this breaks down sulphur compounds in the vegetables.

A carved figure of an *antlered ruminant* found in the tombs of Kish of about 2900 B.C. puzzles archaeologists, who say that it may represent an unknown deer, or a giraffe of a species now extinct.

Playing *hookey* from school may be romanticized in fiction, but study of 130 real cases presents a less pleasing picture of maladjustment, bad home conditions, under-par physical state and other difficulties, a psychologist finds.

One type of bomber requires 96 *zippers*.

Belgians are forbidden to use oils and *fats* for making such products as linoleums, oilcloth and artificial leather.

Possible connection between *vitamin B* and tooth decay will be investigated exhaustively at the University of California Medical Center.

California is unwilling host to more than 500 species of alien *weeds*.

The first commercial *hybrid watermelon*—produced in the same way as hybrid corn—is an Iowa product.

The first printed Bible was not the first *printing* done with movable types, but it was the first such printing job big enough to require a binding.

## QUESTIONS DISCUSSED IN THIS ISSUE

*Most articles which appear in* SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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How will the physically handicapped benefit from the defense program? p. 52.

What experts are on the commission which will study the effects of war on the civilian population? p. 53.


## SCIENCE NEWS LETTER

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MEDICINE

# Chemical Treatment Tried For Infantile Paralysis

## Drug, Name of Which Is Not Divulged, Gives Animals Degree of Protection and May Have Saved Lives

A CHEMICAL which provides a "little lead" in the long search for a drug to cure infantile paralysis has been obtained, but the public must expect "no blitzkrieg" victory over this crippling illness, Dr. Charles Armstrong, U. S. Public Health Service and National Institute of Health, declared at the Fight Infantile Paralysis dinner given in Washington, D. C., in honor of Mrs. Franklin D. Roosevelt.

"A drug has been found which tends to effect a degree of protection and even to save a few animals that otherwise would probably have died," Dr. Armstrong stated, adding that that is "all that can be said today."

The name of the drug cannot be divulged, he said, until the group of scientists who have developed it are ready to announce it. These are Dr. S. D. Kramer, Dr. G. A. LoGrippo and assistants of Lansing, Mich. They are working under a grant from the National Foundation for Infantile Paralysis.

"Chemicals related to this one are now being studied," Dr. Armstrong continued, "and possibly in a year, 10 years, 20 years, or possibly never or possibly tomorrow the sought for magic drug may be found."

The reason why the public should not expect a swift victory over the disease to follow the development of this drug was explained by Dr. Armstrong as follows:

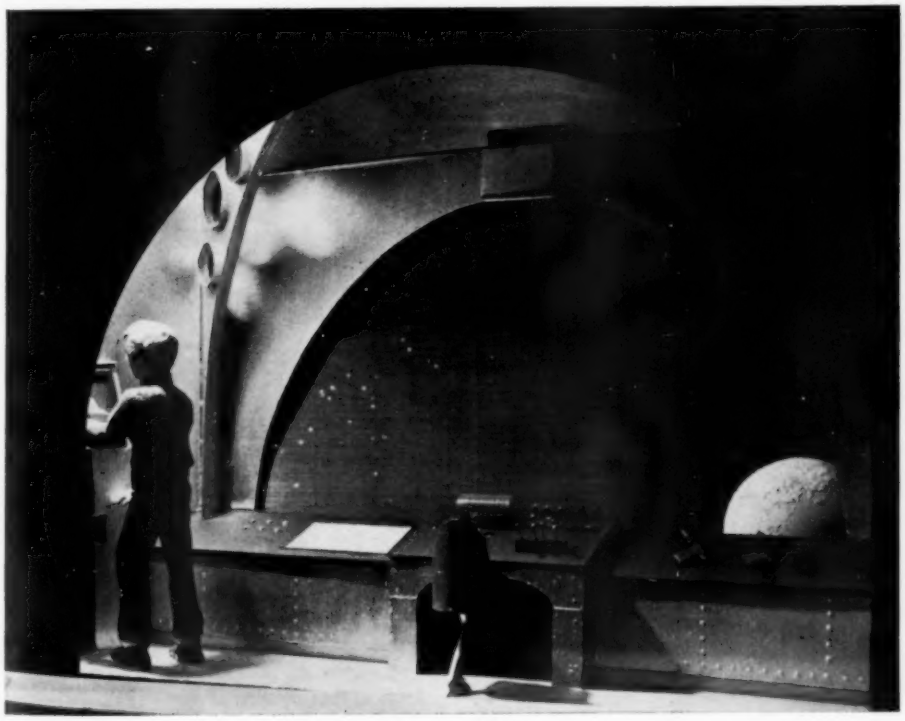
"Think what remarkable properties such a curative drug against infantile paralysis must possess. It must be able to penetrate the central nervous system, even into the very cells themselves and there stop this tough little enemy and do it without permanently injuring the very delicate nerve cells themselves.

"You will agree, I think, that this is a big order and I take my hat off to these workers who day in and day out infect animals with infantile paralysis and then try to cure them with chemicals, only to see the treated animals usually do worse than the untreated ones."

The chances of finding a cure have been markedly improved, he said, by the discovery, at the National Institute of Health, that an inexpensive rodent, the cotton rat of the South, can be infected with the virus of infantile paralysis and, even better, that after having produced a few generations of disease in this rodent the virus was found to affect the common white mouse.

Because mice are so much cheaper and easier to handle than monkeys, formerly the only animal besides man that got infantile paralysis, scientists can try many more chemicals in their search for a curative one.

*Science News Letter, January 25, 1941*



***SPACE SHIP***

*If you should ever be a passenger in a trip through space in some future day, you might witness such a scene as this portrayed in a new exhibit at the Smithsonian Institution.*

GENERAL SCIENCE

## Exhibit Shows Space Ship As Viewed by Scientists

WHAT passengers on a space ship of the future may see is featured in a new exhibit at the Smithsonian Institution, which was opened to the public after the annual meeting of the Institution's board of regents on Jan. 17.

The space ship is shown as heading toward the revolving earth. At the rear of the ship are oxygen bombs, possibly used in propelling the space craft. The pilot has two gas guns handy, as protection against roving space pirates. He is receiving television reports. Before him is an illuminated chart of his course. Outside, the stars are shown in the colors they would have in the depths of outer space.

The Smithsonian Institution has cleared its main hall of all the old exhibits that have been on display there for many years, and has installed a series of modernistic booths, each displaying one phase of its manifold research activities. These range from the solar heaters on which Secretary Charles G. Abbot has been working for many years to a graphic visual summary of the evolution of life on this planet.

*Science News Letter, January 25, 1941*

AERONAUTICS

# Research Is Most Fundamental To Obtaining Air Supremacy

## N.A.C.A. Annual Report Declares Whole Effort of Air Defense Will Be Wasted If Planes Do Not Perform

"SCIENTIFIC research is the most fundamental activity of the Government in connection with the development of America's potential strength in the air," Congress was told in the report of the National Advisory Committee for Aeronautics, transmitted by President Roosevelt. It was submitted to him by Dr. Vannevar Bush, president of the Carnegie Institution of Washington, chairman of the Committee.

"No matter how greatly production facilities may be increased, no matter how many pilots may be trained, unless the aircraft that are built for action are at least equal in performance to those of any possible enemy, the whole effort will be largely wasted," the report continues.

Importance of such research has been recognized, for, it is stated:

"The Army and Navy have maintained the closest contact with the Committee's laboratories and have taken the fullest advantage of the Committee's facilities in the solution of their pressing problems. The Army Air Corps has appointed at the Committee's laboratory at Langley Field a liaison officer, and the Navy's liaison officer, having headquarters in Washington, visits Langley Field at regular and frequent intervals.

"The Committee has two major research laboratories, one at Langley Field, Va., known as the Langley Memorial Aeronautical Laboratory, and the other at Moffett Field, Calif., known as the Ames Aeronautical Laboratory. The flight research laboratory was the first unit of the Ames Laboratory to get into operation. Other units will be placed in operation as rapidly as their construction is completed.

"Both the Langley Memorial Aeronautical Laboratory and the Ames Aeronautical Laboratory are devoted chiefly to aerodynamics, although the Committee has at Langley Field a structures research laboratory, a hydrodynamics research laboratory and a small engine research laboratory. To remedy the deficiency in engine research facilities the Congress by act approved June 26, 1940, authorized the construction of a third major research station for the Committee which is to be an aircraft-engine-research laboratory. The site finally selected by the Committee under authority of that act is adjoining the municipal airport at Cleveland, Ohio, and the Committee is proceeding with its construction. The details of this action are set forth in Part II of this report.

"The Committee highly appreciates the support of the President and the Congress in providing these two additional research stations during the past 2 years. They were indispensable to strengthen research and to accelerate aeronautical progress in the United States. They will prove of great value to the national defense, and it is confidently predicted that their economic value to the Nation will more than offset their cost."

Many of the researches are necessarily secret, for, the report states:

"The Committee has found it necessary in the national interests to withhold from public distribution the detailed results of its researches. Therefore, until world conditions change, this and succeeding Annual Reports will deal only in general terms with the results accomplished."

Higher speed planes, with greatly increased armor and armament, are viewed as the outstanding trend produced by the European war. Special studies to meet these requirements are being made, it is said.

"The demand for increased speed has resulted in the need for much greater horsepower," the report continues. "Whereas pursuit airplanes of a year ago were equipped with engines of 1,000 horsepower, they are now being designed with single engines of 2,000 horsepower. The trends toward increased speed and higher ceiling, toward larger and heavier engines, toward increased armor and armament, necessitate larger and much heavier types of airplanes. This condition has established a definite trend toward higher wing loadings.

"Because of the higher flying speeds demanded by the Army and Navy, the Committee has given special study to the important subject of compressibility shock encountered at high speeds. With the speeds now attainable, it is essential that care be taken to design all parts of the airplane structure so as to prevent velocities approaching the speed of sound from occurring at any point. The 500-mile-per-hour wind tunnel at the Committee's Langley Field laboratory has proved of great value in the study of this problem."

Despite war needs, commercial aviation should not be neglected, the Committee declares. It believes, it says, "that commercial aviation will prove of ever-increasing importance to the United States in promoting international trade and good will, especially in the Western Hemisphere. When the present wars have ended, aviation will have an opportunity to prove its real value to civilization in shortening the distances between nations and in facilitating international trade and commerce. When that day comes, the extension of world trade routes of the air will bring some compensation for the awful destruction wrought and to be wrought by military aviation before peace again prevails."

*Science News Letter, January 25, 1941*

PUBLIC HEALTH

# National Defense Means More Jobs for Handicapped

NATIONAL defense activities with the accompanying stimulation of industry mean more jobs for physically handicapped workers, Dr. D. L. Lynch, of Boston, declared at the Third Annual Congress on Industrial Health held in Chicago under the auspices of the American Medical Association.

Employment placement of 3,067 handicapped persons in the northeastern area of the nation, reported by the Federal Vocational Rehabilitation Bureau, is seen by Dr. Lynch as probably resulting already from the effect of defense activities on industry.

A disabled person, if placed in the right job, is just as efficient as a non-handicapped person, Dr. Lynch believes. Theoretically, three out of every 10 jobs could be handled competently by suitably trained workers with physical handicaps, Dr. Lynch said in pointing out that the range of positions which could be filled by the handicapped is much greater than generally believed.

*Science News Letter, January 25, 1941*

PUBLIC HEALTH

# America's Defense Plans Include Civilian Welfare

## Commission to Study War's Effects in Europe Will Give Attention to Bomb Shelters and Water Supplies

AMERICA'S defense preparations now spread out to include protection of little children and their mothers and others of the civilian population against war wounds, war epidemics and other hardships modern warfare brings to civilians as well as the fighting forces.

Evidence of America's determination to safeguard the health and welfare as well as the lives of her women and children in the event of war appears in the make-up of the commission which sailed for Europe on Jan. 18 to study war's effects on civilians.

Simultaneously with the announcement of this commission, the War Department revealed that since last July a committee of distinguished scientists have been cooperating with army engineers who have now built a number of different kinds of bomb shelters which will be tested to determine the types that give best protection.

Providing safe drinking water and milk to civilians when war is in their midst is a very different problem from providing these during peace or even from providing these to an army in the field. English experience with this problem is just one of the many health and medical problems of home defense on which America will get first hand, expert knowledge through Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service. Dr. Parran is one of the four distinguished civilians accompanying Major Eugene W. Ridings in London.

Dr. Martha Eliot, assistant chief of the U. S. Children's Bureau, is going, in place of Miss Katherine Lenroot, as previously announced, to learn how children and their families can best be cared for when war or threat of war forces them to leave their homes for safer shelter. Dr. Eliot has been studying and collecting information on this problem since the days of the civil war in Spain and the early stages of the conflict in China.

Evacuation of civil populations from war-imperilled areas brings problems to agencies such as the Social Security Board. How to make social security effective even in war will be studied by another member of Major Ridings' commission, Geoffrey May, assistant director of public assistance of the Social Security Board.

The protection and use of transportation and other facilities during war will be studied by Frederick C. Horner, assistant to the chairman of the General Motors Corporation.

*Science News Letter, January 25, 1941*

PHARMACY

## Drug Manufacturing Called The Offspring of Wars

THE SPREAD of war around most of the world has caused many American scientists much worry over possible shortage of important medicines. Efforts to produce in this country a satisfactory malaria prophylactic, for example, have been intensified because of the danger that the quinine supply from the Dutch East Indies might be cut off. The digitalis used in certain kinds of heart disease is imported, and so is the cod liver oil which saves large numbers of American babies and children from rickets. The situation is not acute so far, and historical precedent suggests that the men and women who make drugs in America will find a way to keep us independent of foreign sources.

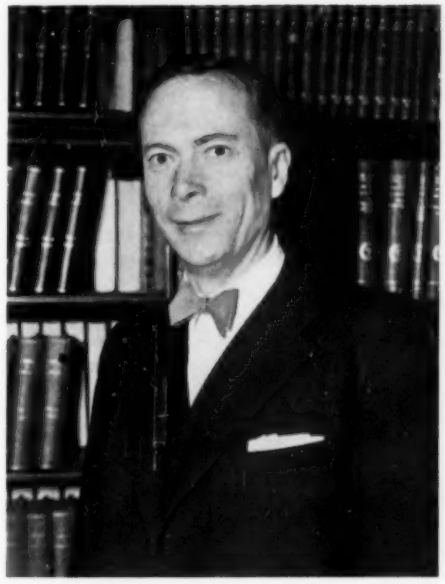
"Manufacturing pharmacy in America has been the child of wars," is the timely reminder found in a new *History of Pharmacy* by Dr. Edward Kremers, former professor of pharmaceutical chemistry at the University of Wisconsin, and Dr. George Urdang, honorary member of the American Pharmaceutical Association. (*Reviewed SNL, this issue*).

American manufacturing pharmacy, they state, "was born during the Revolutionary War. It took the decisive step from childhood to manhood after and in consequence of the Civil War, and it became independent from Europe and dominant on the world market after the First World War."

America's first wholesale druggist in the modern sense, apparently, was Andrew Craigie, army apothecary during the Revolutionary War, who managed a laboratory in which medicines for military hospitals and the army were prepared. After the war, Craigie entered the wholesale drug business "a century ahead of his time."

After this war also, in 1786, the firm of Christopher, Jr., and Charles Marshall, wholesale and retail druggists in Philadelphia started making ammonium chloride and Glauber's salts on an extensive scale, "being probably the first to produce pharmaceutical chemicals on a large scale in this country."

*Science News Letter, January 25, 1941*



*VITAMIN K DISCOVERER*

***Tiny babies in danger of bleeding to death in their first short week of life and older persons threatened with fatal bleeding in obstructive jaundice have been dramatically rescued by doses of vitamin K. Here is the man who discovered this anti-bleeding vitamin, Dr. Henrik Dam, associate professor at the University of Copenhagen's Biochemical Institute. Dr. Dam is in the United States visiting colleagues who have done much to bring his discovery to practical, life-saving application.***

*Science News Letter, January 25, 1941*

PUBLIC HEALTH

## Influenza Epidemic May Reach 1929 High Level

THE increased number of influenza cases reported to the U. S. Public Health Service now suggests that the present epidemic may be as big as that of 1929, when 195,939 cases were reported in one week (Jan. 5) at the peak of the epidemic. The 1929 epidemic was the biggest since 1918.

The peak of the present epidemic has not yet been reached but the latest weekly

total of cases reported throughout the nation was 89,828 for the week ending Jan. 11.

The epidemic has reached as far east as New England, where Maine reported 1,345 cases and New Hampshire 1,000, and the Southeast, with 4,200 cases reported in Virginia and 3,686 reported in South Carolina. Health authorities expect the total to be greatly increased when the thickly populated states of New Jersey and New York feel the full force of the epidemic. Pennsylvania does not report influenza in figures, but the health officer states there is an epidemic in the western part of the state and that there are many cases scattered throughout the rest of the state.

On the West Coast the epidemic is dying down, but Texas and Louisiana both reported increases over the previous week's figures. In Texas 33,283 cases were reported and in Louisiana 4,983.

*Science News Letter, January 25, 1941*

EVOLUTION

## Evolution Under Attack By Nazis in Germany

EVOLUTION is under violent attack in Germany primarily because Darwinian teachings deviate from the Nazi "party line" states Dr. Otto Haas of the American Museum of Natural History. (*Science,* Jan. 10) Dr. Haas cites a German "semi-scientific" publication, entitled *Natur und Kultur,* in which ten different authors make violent attacks upon evolution, especially with regard to the origin of man from apelike ancestors.

Dr. Haas calls particular attention "to a fact most striking to a scientific reader: nowhere are the conclusions derived from the results of research; on the contrary, the former are tested as to whether or not they agree with the national socialist racial theory ('Rassenlehre'). If they do not they have to be rejected. . . . It is no less striking to see that the adversaries of evolution reproach its advocates, alleging that the latter make them politically suspect."

One author, H. Weinert, rejects all these arguments as "pseudoscientific objections against the theory of human descent," but even he apparently tries to bolster up his scientific argument with an appeal to the party line, "asserting that, should the origin of man be questioned, the adversaries of the national socialist 'race hygiene' tendencies should cite the uncertainty of science."

*Science News Letter, January 25, 1941*

PSYCHOLOGY

# Robot Could Find Own Food And Water, Refill Itself

### Automatic Devices Would Signal Switchboard Brain When Robot Tanks Needed Replenishing, or When Full

IF WARFARE of the future becomes so mechanized that the actual fighting is done by mechanical gladiators, the super-fuehrer of that fantastic day might build his robot recruits by the recipe prepared by Dr. Clark L. Hull, Yale University psychologist.

Dr. Hull is known among his colleagues for having designed and actually had built a mechanical brain—an electrical machine which can "learn" from experience and (even more human) forget.

Now he goes further and provides scientists with the "blue-prints" telling how a complete robot would have to be built so that he might keep himself "alive" by securing his own food and water.

First such a robot would have to be provided with means for moving about. Inactivity would be fatal.

Two tanks would have to be built into him, one for fuel or food, one for water. These tanks would have to have an attachment for signaling when they were filled to the bursting point and also when their stores were nearing exhaustion.

These signals would have to be connected with outside apparatus for filling the tanks automatically and this connection would have to be completed through a brain, or switchboard.

The outside apparatus, the hose, would have to be able to move about freely like an insect's antenna, exploring until contact with the fuel or water was made. To prevent filling the water tank with gas, or the gas tank with water, the filling mechanism might be activated chemically only by the appropriate substance.

All these ingenious devices in the robot parallel the much more complicated mechanism in the human and animal body for finding, storing and converting into energy the food and other needs for survival, Dr. Hull pointed out. A man earning a living goes through a great deal of trial-and-error activity, much of which turns out to be useless, before he can get actual contact with the beefsteak and drinks his own "tanks" demand.

When the robot is built so that he can fill his own tanks, he still needs some sort of directional apparatus that will guide him to the source of his nourishment. Dr. Hull's design provides for this with two gadgets which the engineer could easily construct.

One device will turn the robot around when he needs water until a light over his water supply shines at its brightest on the photoelectric "eyes" in his forehead. He will then be set in motion in the right direction.

The other gadget will turn the robot until a buzzer over the food supply records its loudest in his sound sensitive "ears."

The human body has much more complex apparatus for signaling hungers and other needs and for guiding the individual to their satisfaction, but nevertheless, Dr. Hull concludes, the whole complex human personality may be thought of as a magnificent machine which only the master-Fuehrer who is also a super-scientist might design.

*Science News Letter, January 25, 1941*

Sent by the U. S. Fish and Wildlife Service, three boats have been out in Bering Sea to gain practical information for developing an American *crab meat* industry, where Alaska King crab abound.

*SELF-SUSTAINING*

***Dr. Hull's suggestion for a robot that gets its own fuel and water is pictured in a drawing by the artist, Jo Low, prepared under his supervision***

AGRICULTURE

# U.S. Self-Dependence Stressed In Plant Industry Report

## Search Continuing for American Foods, Flowers, Insecticides, Tung Oil and Natural Rubber

ABILITY of the United States to get along on its own, or to replace former dependence on the Old World by mutual aid between peoples of the Western Hemisphere, figures importantly in the annual report of the Bureau of Plant Industry to the Secretary of Agriculture.

An outstanding influence of such intra-hemisphere aid is the announcement that new kinds of wheat from Brazil are showing high resistance to leaf rust and some degree of resistance to stem rust as well. These wheats are being used as breeding stocks in producing rust-resistant wheats for growing in the Southwest.

The Biblical maxim that "man shall not live by bread alone" receives practical exemplification in the production of new, American-produced Easter lily bulbs, to replace the stocks heretofore imported from Japan. The new American lilies can be grown so far out of season that they can be brought into bloom for use at Thanksgiving time as well as halfway around the calendar, at Easter.

Possible plant sources of poison for insects that eat other plants are being investigated by the Bureau. Most promising are new strains of the rustic tobacco plant (*Nicotiana rustica*) which produce several times more nicotine than is obtainable from ordinary tobacco. Another possible source of anti-insect munitions is the native seashore plant known as devil's shoestring, which yields rotenone, at present extracted from East Indian derris and South American cubé.

Further declaration of independence of foreign sources is proclaimed in such diverse fields as fertilizers, sugar-beet seed and tung oil. Magnesium for mixed fertilizers used to be imported from Germany; Bureau chemists have shown how to use an American magnesium compound with satisfactory results. For potato fields, domestic muriate of potash is shown to be a good substitute for imported (and more expensive) potassium sulfate.

During World War I, the American beet-sugar industry found itself in a bad way for lack of foreign-grown beet seed, on which it had become dependent. The Bureau of Plant Industry insisted on the development of an American source of seed—and sugar-beet growers have reason now to be glad they did.

Efforts to grow the Chinese trees that yield tung oil have run into some difficulties because of their sensitiveness to cold. This, the report states, is mitigated when the trees are in a fully dormant state at the onset of the cold wave.

Cold-resistance seems to be possible also in the tropical Hevea rubber trees that have been the subject of breeding experiments at the Bureau's experimental farm at Coconut Grove, Florida. So well have Hevea trees thriven there that the Bureau scientists have been able to pull a coals-to-Newcastle stunt—they have sent some of the seeds grown there for planting in tropical American countries!

*Science News Letter, January 25, 1941*

HORTICULTURE

## Orchid Imports From Europe Now Cut Off By War

GLAMOUR girls with a yen for orchids are among those feeling (more or less) the hardships of war. For the European greenhouses that used to supply much of the American market for rare and exotic blooms have been cut off from the American market (glass doesn't stand up very well against bombings) and the American orchid-raising industry has not yet been developed sufficiently to meet the full demand.

As one result, orchids sent by collectors direct from their native homes in the tropics are having something of a boom. This, however, has its own drawbacks, it is pointed out by E. R. Sasscer of the U. S. Bureau of Entomology and Plant Quarantine. Orchids grown in European greenhouses are usually free from pests and diseases, whereas those from the tropics must be very carefully inspected to see that they do not bring in any of their considerable assortment of the insects and fungi that prey on them in their native state lest these get loose and wreak havoc in American greenhouses.

*Science News Letter, January 25, 1941*

GENERAL SCIENCE

## Commonwealth Fund Backs "Long Shot" Researches

THE Commonwealth Fund, philanthropic organization, was revealed as a backer of "long shots" in the report of its activities during the past year.

"One out of every three of the research projects now being aided by the Fund might be called a 'long shot,' while the other two are sufficiently conservative in conception and conventional in method to warrant the confident prediction of a successful outcome," states the report from Barry C. Smith, general director of the Fund.

Medical education and research received one-third of the $2,000,000 appropriation for the year. Other health services, including chiefly aid to rural health departments and rural hospitals, received nearly $1,000,000.

The war brought the problem of relieving immediate suffering without sacrificing the long-time program designed to prevent such suffering. Steering a "middle course between underplanned and overplanned giving," the Fund appropriated $135,000 for war relief through the American Red Cross, the Allied Relief Fund (now the British War Relief Society), and Finnish Relief Fund, the Harvard Medical School Epidemiological Commission to England, and the assistance of English Refugees.

The child guidance program supported by the Fund in England, although suffering some disruption of organization because of the war, has apparently increased its usefulness especially with regard to problems arising from evacuation of city children to rural areas.

Explaining the Fund's policy of backing "long shots" in research, Mr. Smith states: "It is good for a foundation to take long risks in some of its philanthropic investments. In these frontier jobs objectives may be dim, long efforts fruitless, and findings confusing. Yet out of them may come the revolutionary concepts that point the way for a generation of medical progress."

*Science News Letter, January 25, 1941*

ASTRONOMY

## New Star Camera Will Film Moon and Planets in Motion

AN INSTRUMENT for making movies of stars has been built by a man who recently, in company with Walt Disney, was awarded a medal by the Society of Motion Picture Engineers.

However, the stars that this man, Dr. Robert R. McMath, Director of the McMath-Hulburt Observatory of the University of Michigan, will film, are of the heavenly, not the Hollywood, variety.

In a report to the American Astronomical Society he told of the newest telescope for these pictures. They will show sunrise and sunset on the moon, the spinning of Jupiter and the movement of his moons around him and other heavenly motions.

The new telescope is a memorial to his father, the late Francis C. McMath, who helped establish the observatory as an amateur institution more than a decade ago. With a smaller instrument, they first made such pictures. Later, however, they became particularly interested in motion pictures of the sun, from which remarkable new facts have been learned.

Now Dr. McMath has announced that for educational purposes they will make such pictures again, retaking many earlier subjects with the new and more powerful equipment.

*Science News Letter, January 25, 1941*

ENTOMOLOGY

## Insect Pests Evolve New and Tougher Races

EVOLUTION while you watch, producing distinctly recognizable new races of insects in less than scientist's working life, was described by Dr. Harry S. Smith of the California Citrus Experiment Station in his address as retiring president of the American Association of Economic Entomologists in Philadelphia.

The trouble with the evolution described by Dr. Smith, from the human point of view, is that the new kinds of insects are all undesirable ones—even less desirable than their ancestral races. When men spray their orchards or vegetable crops to kill off the pests, it only results, finally, in the production of new races on which the spray has greatly diminished effect. It is an origin of new kinds of pests through the survival of the toughest.

A suggestion that this sort of thing could happen was first put forth a quarter-century ago by Prof. A. L. Melander, now of New York City College, Dr. Smith stated. Entomologists refused to take the idea seriously then, but they generally accept it now.

The situation is even more serious than Prof. Melander imagined, Dr. Smith continued. In a number of instances, the new race of insects that originates by surviving one kind of poison also shows high powers of resistance to other, chemically unrelated kinds. Thus, codling moth larvae that have become resistant to arsenic prove hard to kill with pyrethrum and rotenone, and red scale insects that refuse to die under cyanogen fumigation resist other poison gases as well.

New races have evolved not only in response to man's unintentional substitution of himself for the force of natural selection. By supplying new types of homes and food, man also gives insects opportunities to originate new races adapted to the new conditions. This has happened in California, where since 1918 the codling moth, until then a major pest only in apple orchards, has produced an entirely new race that has become a scourge of the walnut orchards.

Recognition of these quick evolutionary changes in insect pests at once presents a new challenge and a new opportunity to the men who spend their lives leading the fight against them, Dr. Smith pointed out. It is now evident that the foe we are contending against never "stays put," but shifts his biological position as soon as we have got his biological range. At the same time, however, knowledge of this fact enables more intelligent and effective planning of campaigns.

*Science News Letter, January 25, 1941*

ENGINEERING

## Molded Rubber Fenders Widely Used in Britain

MOLDED rubber fenders are coming into increasing use on trucks and buses in Britain, partly as a consequence of the blackout. Collisions are much more frequent, naturally, on darkened streets and roads, and owners of vehicle fleets find much to recommend in fenders that straighten out their own dents after being bumped into. Besides, substitution of rubber for metal releases just that much more steel for war uses. The rubber fenders are manufactured by one of the pioneer tire-making firms in England.

*Science News Letter, January 25, 1941*

IN SCIEN

BIOLOGY

## Colchicine Gives Chickens Double-Size Combs

COLCHICINE, wonder drug that produces giant plants and causes great speed-up in evolutionary changes, has been used successfully for the first time in producing apparently similar changes in animals by Dr. Edna Higgins of the University of Pittsburgh. Dr. Higgins reported results of her experiments on chickens before the American Association for the Advancement of Science.

Earlier experiments with colchicine on animals have uniformly resulted in the early death of the animals, when the drug was used in sufficient concentration to obtain any results at all. However, by injecting very small amounts of highly dilute colchicine solutions into eggs at various stages of incubation, Dr. Higgins has succeeded in obtaining six healthy birds that have survived to maturity.

In one group of four chickens, injected after 72 hours of incubation, now 17 months old, the combs and wattles of both males and females are twice the normal size, and the males also have two abnormally long tail-feathers apiece. Two others, out of a group injected during the thirteenth day of incubation, show less effect.

Further work is now being conducted to determine whether colchicine produced the effects directly, or whether it worked through the sex glands, which control such secondary sexual characters as combs, wattles and tail-feathers.

*Science News Letter, January 25, 1941*

FORESTRY

## Deforested Lands Greater In Area Than All Italy

DEFORESTED lands greater in area than the whole of Italy still await replanting with trees, the U. S. Forest Service has reported at the close of its annual stocktaking. The total tree-stripped land amounts to 77 million acres, of which only three million are owned by the government and 74 million are held by private owners.

*Science News Letter, January 25, 1941*

## NE FIELDS

PUBLIC HEALTH

### 2,000 Eyes Lost Yearly In Preventable Accidents

PREVENTABLE accidents in industry cause the loss of 2,000 eyes and more than $50,000,000 yearly, Dr. Thomas D. Allen, of Rush Medical College, Chicago, declared at the Third Annual Congress on Industrial Health, sponsored by the American Medical Association.

The $50,000,000 loss does not include such indirect losses as subsequent reduction in earning power of the worker with impaired vision. These losses, Dr. Allen and Dr. Henry F. Carman of San Francisco estimate, are probably four times as great as the direct loss.

Besides the 2,000 eyes that are completely lost each year in preventable industrial accidents, there are 300,000 eye accidents which incapacitate the worker for one day or more.

Suitable goggles are the best means of protection, Dr. Allen said, because about 80% of all industrial accidents involving the eyes are due to flying bodies.

*Science News Letter, January 25, 1941*

ZOOLOGY

### Groundhog Has Good Alibi: Never Asked For That Job

**See Front Cover**

MARMOTA MONAX, alias Groundhog, alias Woodchuck, has a good alibi to offer in his own defense when he is arraigned before the Bar of Superstitious Injustice on the charge he has to face every year, of unduly prolonging the winter through the black (or at least gray) magic of looking at his shadow. He never asked for the job; it was wished on him by silly human beings, who, finding no hedgehogs in the New World, thrust upon his harmless shoulders the load that the prickly little Old-World creature has had to carry for centuries.

Moreover, while it is not unreasonable to expect the European hedgehog to see its shadow on Feb. 2, there is no sense whatever in looking for a like performance on the part of the American groundhog. Hedgehogs do come out on sunny days in winter, but groundhogs are sound sleepers. In the parts of this country that have real winter weather, they do not commonly break their hibernation until about mid-March. St. Patrick's Day, rather than Candlemas Day, would be more appropriate as Groundhog Day, if we paid any attention at all to the actual habits of the animal.

The photograph reproduced on the front cover is in itself testimony to the pointlessness of looking for groundhogs, with or without shadows, on Feb. 2. The date of its taking (by J. Southgate Y. Hoyt's Graflex camera) was June 22, 1939. It is being shown in Boston now, at the International Salon of Nature Photography.

*Science News Letter, January 25, 1941*

PHYSICS

### First Commercial Electron Microscope Now In Use

THE first American commercially built electron microscope — an instrument capable of magnifying 100,000 times — is now in use in Stamford, Conn.

Constructed by the RCA Research Laboratories in Camden, N. J., the new super-microscope, which takes pictures with electrons instead of light waves, is in the laboratories of the American Cyanamid Company. Already used in studying pigments for the paper industry, it has shown that the very minute particles have the same crystalline structure as the larger ones observed with old type microscopes, disproving a widely held theory.

*Science News Letter, January 25, 1941*

NUTRITION

### Vitamin C Destroyed In Discolored Fruit

BROWN, discolored fruit is not only unpleasant to look at and frequently flat and flavorless to taste, but it also cheats you of the vitamins you are paying for, Dr. M. A. Joslyn of the University of California Agricultural Experiment Station has found.

Dr. Joslyn has made a particular study of the kind of discoloration known as browning. This is a result of an oxidation reaction, in which vitamin C is destroyed along with the pigments that give the fruit its attractive coloration. In dried fruits, treatment with sulfur dioxide, long a standard practise for maintaining light color, was also found to check the lowering of the vitamin content.

*Science News Letter, January 25, 1941*

PHYSICS

### Yeast Cells Provide Test For Presence of Silver

LIVING cells of brewer's yeast seem to act like giant molecules in a reaction with silver, affording an extremely delicate test for this and other metals. Members of the American Physical Society, meeting at the California Institute of Technology, were told this by two scientists from the host institution, Drs. Alexander Goetz and S. Scott Goetz.

They gave a demonstration before the session, showing how the yeast cells could be used to reveal the presence of about three billionths of an ounce of silver. The test became possible after they had found a new method of staining the yeast cells. After this treatment the cells are examined under the microscope and those that have been killed by the metals can easily be distinguished from the others.

By such an examination it is possible to measure the proportion of cells that the metals have affected. Using mathematical formulae, the amount of metal can be calculated.

*Science News Letter, January 25, 1941*

ENGINEERING

### Put Microphone Off Stage To Increase Realism

BY PLACING the recording microphone where the audience would be, rather than among the musicians or speakers, increased realism will be obtained in sound movies, phonograph recordings and radio broadcasts. Speaking before the meeting of the Society of Motion Picture Engineers, Dr. H. F. Olson, of the R.C.A. Research Laboratories, described a new microphone which makes this possible.

It is called a "line microphone," and picks up sounds in a number of tubes, equally spaced along a line eight feet long. Only sounds coming along the line are effective, so it is sensitive exclusively to sounds in the direction that it is pointed.

"With this microphone," said Dr. Olson, "you can pick up a symphony orchestra at 100 feet, the best location from an audience standpoint." In many cases, he said, the microphone could be placed alongside the camera, instead of being suspended from a boom above the heads of the actors or musicians. With the older types this is necessary, since they are more or less sensitive in all directions.

*Science News Letter, January 25, 1941*

ASTRONOMY

# Five Planets Shine

## Three Are in Evening Skies, Two Are Morning Stars; Winter Star Groups Will Brighten February Heavens

By JAMES STOKLEY

AGAIN, the two planets, Jupiter and Saturn which, in recent months, have been dancing together in a complicated step, form a conspicuous pair in the evening sky. They are to the west, in the constellation of Aries, the ram. At the beginning of February, Jupiter is lower, but it passes Saturn on the 20th. However, Jupiter is considerably brighter, which makes him easy to identify.

During the day, on February 3, the crescent moon will pass these planets. The previous evening it will appear below them, and that evening just above.

Sirius, the dog star, directly south, is the brightest star at night. Though it does not equal Jupiter, it does exceed Saturn. It is part of Canis Major, the big dog. Above this group is Canis Minor, the little dog, with the star Procyon.

Magnificent Orion, the warrior, now dominates the southern sky. To find him, look for the three stars in a row, that mark his belt. Betelgeuse is above, Rigel below.

A line from Sirius, through the belt stars, and about an equal distance the other side, will bring you to a V-shaped cluster, the Hyades, in which is the first-magnitude Aldebaran, red in color. This is part of Taurus, the bull, marking the animal's eye according to the old maps.

Still higher is Auriga, the charioteer, with Capella, and nearby, between this group and Canis Major, one views the twins, Gemini. Pollux is the more brilliant of the pair, to the south. The other is Castor.

Still another object of the brightest class can now be found in the evening, Regulus, in the figure of Leo, the lion, high in the east. This star marks the handle of a smaller group called the sickle.

To the north, the Great Dipper, in Ursa Major, the big bear, is swinging into a better position than it has had for months. The handle hangs down; the pointers, two stars at its top, indicate the pole star to the left. On the other side of Polaris is Cassiopeia, like a W turned on its side.

All these are shown on the accompanying maps, where the heavens appear at 10:00 p.m. in the beginning, 9:00 p.m. at the middle, and 8:00 p.m. in the closing days of February.

The other three naked eye planets will also appear during the month. On the tenth Mercury will be farthest east of the sun, and may be glimpsed low in the west as dusk is gathering. Mars, red in hue, is in Sagittarius, the archer, and rises about 3:30 a.m. Venus, more brilliant even than Jupiter, is in Capricornus, the sea goat, and comes above the southeastern horizon soon after 6:00 a.m.

February sees the concluding stage in a very rare heavenly event. When Jupiter passes Saturn on February 20, it will be for the third time since last summer. The astronomer refers to such a passing of one planet by another as a "conjunction." The first of the present series took place on August 15, the second on October 11.

Such a series, within less than a year, is called a "triple conjunction." It happened last in 1682-1683. Before that, it happened in 1425. It also occurred in 6 B.C., and may have been one of the celestial events to attract the attention of the Wise Men.

Apparently no one has yet bothered to calculate when it will occur again, but it will be a couple of centuries at least, for triple conjunctions come, on the average, about four times in a thousand years.

The reason that we have had these three successive passings may be found in the movement of the earth. The nearer a planet to the sun, the faster it travels. The earth's speed is 18.5 miles a second; Jupiter moves at 8 miles per second and Saturn at 6 miles per second.

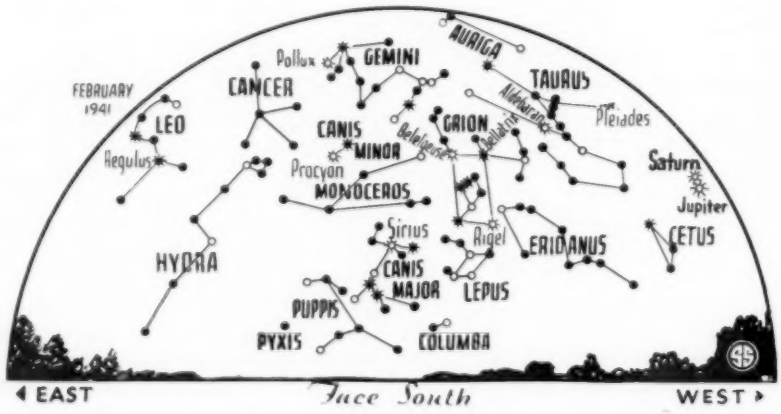
They all travel about the sun the same way but, of course, when the speedy earth overtakes our plodding neighbors, they seem to retreat. Normally their movement is from west to east—then it becomes "retrograde," from east to west. Every year we overtake these planets, and they show such a retrograde movement.

Jupiter goes around the sun in 12 years. Saturn in 29.5; the former catches up to the latter and there is a conjunction of the two about every 19 years. It so happened that the conjunction in August came just before the retrograde movement began. Therefore, after Jupiter passed his brother planet the first time, both started backwards, and there was a second conjunction.

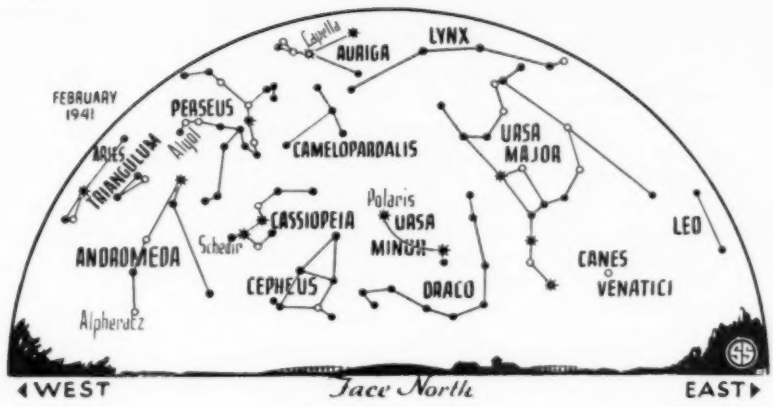
Early in January they ceased their backward movement and started forward again, making ready for the third passing on February 20. About 1959 they will once more be in conjunction, but this will not be timed the way these have been. When, after that, Jupiter starts to back, he will not quite reach Saturn.

Almost directly overhead on these evenings it is possible to see a demon!

To us now, it looks like another star, but the Arabs used to call it "Ras al




☼ ✸ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS




Ghul," which means "the head of the demon." Why they gave it such a name is something of a puzzle, because most of the Arabic star names, many of which we still use in slightly modified form, are more complimentary.

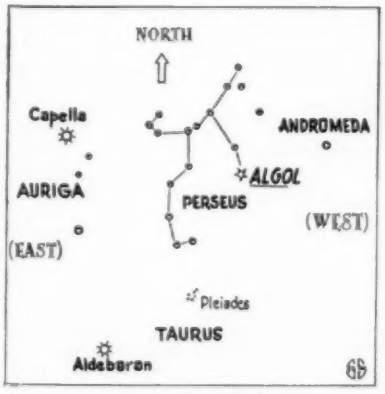
However, they might well have called it a demon if they had recognized what astronomers have learned about it, for this star, which we call "Algol," is one of the most famous of all variables, stars that change regularly in brightness, and it might easily bring to mind the blinking eye of some baleful creature as it goes through its cycle. Aside from the name, there is no indication that Arabs noticed this variability, but it has been suggested that they did.

The small map shows how to find Algol at this time of year.

Perseus, in which Algol is found, is just west of Capella. In shape it resembles two great fish-hooks, one of which, Perseus' foot, is immediately north of the Pleiades. Algol is near this hook. Ordinarily Algol is of the second magnitude in brilliance, a little brighter than the pole star, to the north. But late on the evening of Feb. fifth, and earlier on the eighth, eleventh and fourteenth, it will appear only about a third as bright.

Reason for this variation is that Algol really is two stars, revolving around the common center of gravity. Many such "binary" systems are known in the sky, but two features make Algol notable. First, the plane in which they revolve is almost in line with the earth; second, one of the stars is bright, the other very much darker. This means that on every revolution, which takes 2 days, 20 hours, 49 minutes to complete, the dark one comes in front of the bright star, and there is a partial eclipse. From the time the dark body starts coming in front of the other until the eclipse is greatest takes about five hours, then five hours more and Algol shines with its full vigor.

No telescope is powerful enough to show the separate stars in the system, but their presence is revealed by analyses of the light made with the spectroscope. The lines that are formed in this spectrum swing back and forth regularly in the same period in which the light changes. This proves that the brighter star is alternately approaching, then receding, as its dance goes on, and that there must be another star there, even though we cannot see it, to be its partner and hold it by gravitational pull.




*HOLD OVERHEAD*

## Celestial Time Table for February

**Sunday, Feb. 2,** 9:00 p.m., Moon farthest —251,300 miles away. **Monday, Feb. 3,** 1:59 p.m., Moon passes Jupiter; 4:28 p.m., Moon passes Saturn. **Tuesday, Feb. 4,** 6:42 a.m., Moon in first quarter. **Thursday, Feb. 6,** 2:22 a.m., Algol at minimum. **Saturday, Feb. 8,** 11:11 p.m., Algol at minimum. **Monday, Feb. 10,** 7:00 p.m., Mercury farthest east of sun, visible low in west after sunset. **Tuesday, Feb. 11,** 7:26 p.m., Full moon; 8:01 p.m., Algol at minimum. **Friday, Feb. 14,** 3:00 p.m., Moon nearest, 227,000 miles away, 4:50 p.m., Algol at minimum. **Tuesday, Feb. 18,** 1:07 p.m., Moon in last quarter. **Thursday, Feb. 20,** 2:00 p.m., Jupiter passes Saturn; 9:52 p.m., Moon passes Mars. **Monday, Feb. 24,** 9:15 p.m., Moon passes Venus. **Tuesday, Feb. 25,** 10:02 p.m., New moon.

Eastern Standard Time throughout.



PSYCHOLOGY

# Find Individual Differences Even Among Paramecia

DESPITE the present tendency toward regimentation, individual differences do exist even among the paramecia, those little microscopic creatures that dart about in pond water.

They differ in ability to "taste," or at least in what would more accurately be called chemical sensitivity. Some can take more salt on their food than others, and are likely to persist in this over a period of time. This was discovered by Dr. John W. French, Princeton psychologist, when he watched the behavior of paramecia from the same colony when dinner was served. His results are reported in the *Journal of Comparative Psychology*. (December, 1940)

The little water creatures also differ in what might almost be called "social habits," Dr. French found. When bacterial food was placed with a dropper in the exact center of their miniature laboratory pond, practically all the paramecia swam into the food area and once there refused to leave. Within a few minutes only a few stragglers remained away from the feast. Then, in a short time, the animals within the food area formed many groups, motionless and in contact with one another. Others, "solitary drinkers," swam about outside any group.

By an ingenious method, Dr. French "counted" those within the groups and also the free-swimming animals. When an electric cathode was dipped in, it attracted almost all the free swimmers. These were removed with a dropper and placed in one dish. The grouped animals were then put in a separate dish. Repetitions of the experiment showed that more of the previously grouped animals again formed into groups than in the case of those who had previously remained free.

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Next Dr. French tried salting the food. Some animals were attracted to the salty food, but others avoided it. By putting his dropper into the exact center of the food area, Dr. French was able to separate the salt eaters from the others. He put them into separate dishes, and repeated the experiment. More were attracted to salty food in the dish of previous salt eaters than in the dish of those who had a record of abstaining.

In this way, the paramecia demonstrated their consistent individual differences in sensitivity not only to salt, but also to potassium iodide and potassium chloride. Differences were almost entirely absent in "taste" for caustic soda, however.

*Science News Letter, January 25, 1941*

AGRICULTURE

# Race Dogmas Challenged In Wallace's Report

## In Final Annual Report as Secretary of Agriculture, Declares Western Hemisphere Has No Room for Such Ideas

"THERE is no room in the Western Hemisphere for any notions about racial superiority."

This counter-challenge is thrown into the faces of "New Order" race dogmatists by Henry A. Wallace, now just become Vice-President of the United States, in the midst of the biological and economic discussions that occupy his last annual report as Secretary of Agriculture. Speaking with the authority of his first-hand knowledge of genetics, which had gained him repute as a scientist before he ever entered public life, he lashes unsparingly at doctrines that would rearrange the world on a master-and-slave status:

"Theories of racial superiority and racial inferiority have no scientific basis. Certain nations may be very different by training from other nations; by inheritance they are probably little different.

"Millions living in Germany are different from us chiefly because of an indoctrination systematically instilled into them from early youth. They have had more training in hard work, in giving their all to the fatherland, and in submission to economic and military rule. Many of them believe war is holy and think the achievement of German domination justifies any means. But if numerous American children had been adopted into German families 20 years ago, they would be just the same. They would be indistinguishable from native-born Germans.

"Probably any favorably located race can develop a civilization. The Indians of Latin America did so. Civilizations of long ago in Africa, China, Japan, and India were not inferior in many respects to those of today. In this hemisphere, broadly speaking, we have democratic types of civilization, and they rest on a genetic basis."

In the report, much emphasis is placed on the necessity for adjusting American agricultural production to the existing market. Pre-war measures taken by practically all the nations anticipating the outbreak of hostilities had sharply diminished our old export markets, especially for wheat, cotton and tobacco, and the events of the war have cut still further into possible outlets for those crops. On the other hand, home markets for such things as meats, dairy products, fruits and vegetables are steadily improving.

In the presence of this situation, Mr. Wallace points out, "Growing unneeded crops is sheer waste of labor, of capital, and of soil, even if temporarily the products can go into storage under Government loans. It is a drain on resources that would otherwise be available for national defense."

Better trade relations with other Western Hemisphere nations are recommended in the report. Obviously, the United States cannot import from South America commodities of which it already has surpluses, like Argentine wheat or Brazilian cotton; for these, joint effort in seeking sales outlets would seem to promise more satisfactory results. In the meantime, there is plenty of room in United States markets for a whole array of products whose very names suggest the exotic: abaca, cinchona, kapok, rotenone, tea, cocoa, camphor, rubber, tropical hardwoods. Most of the North American demand for these things is now supplied from the Old-World tropics; and even so that demand should be capable of considerable further growth.

*Science News Letter, January 25, 1941*


# Books

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# RADIO

**J. J. McEntee, director of the Civilian Conservation Corps, will discuss the CCC's health and safety programs as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Jan. 30, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.**

BIOLOGY

## Sex of 'Possums Modified With Hormones After Birth

MODIFYING sex in animals after they were born is the scientific feat reported by Prof. Carl R. Moore of the University of Chicago in the new issue of *Physiological Zoology* (January).

Opossums were the animals used in the experiments. They were the only readily available animals adapted to the methods used, because opossums are born in an "unfinished" condition and are immediately placed in the mother's brood pouch, where they remain for 60 or 70 days, completing their development. The only other animals that do this kind of thing live in the Australasian region; with the opossums, they constitute the great primitive mammalian group known as marsupials.

Opossum young, Prof. Moore discovered, are as "unfinished" sexually as they are in other ways when they are born. Rudiments of sex glands are there, but they do not show definite signs of becoming either male or female until the third day after birth. Accessory and secondary sex organs and tissues show differentiation even later.

Prof. Moore treated opossum young from three to 100 days old with male and female gland extracts or hormones. The substances were either mixed into ointments and rubbed on the animals' naked skins or were injected as solutions.

The experiments showed that even as early as the third day of post-natal development, sex is already sufficiently determined that it cannot be reversed by hormone treatment, for neither male nor female sex glands were turned from the course of development they had started by the action of the opposed sex hormone. On the other hand, a number of changes, some of them quite radical, took place in the accessory and secondary sex structures. Female hormones caused male characters to shift in the female direction, and vice versa.

*Science News Letter, January 25, 1941*

GENERAL SCIENCE

# Canadian Science Supports Dominion's War Effort

## Workers Calibrating Gauges, Making Optical Parts, Studying Personnel Selection Methods and Nutrition

CANADA'S war efforts are receiving the benefits of scientific researches in many fields, the National Research Council of Canada reports, on the basis of a check-up of the activities of workers coordinated through its agency. These benefits of science are derived both directly, as in the munitions and aircraft industries, and indirectly in such things as safeguarding the Dominion's health and food.

One very critical spot, at the outbreak of hostilities, was the work of calibrating gauges of all kinds, in the Council's section on metrology. Little work of this kind had been done in Canada before the war, so that it was necessary to send representatives to Britain to study latest methods in testing munitions gauges. Now there are two laboratories, one at Ottawa and one at Toronto, where the greatly increased volume of gauge calibration work is being taken care of.

There was also a grave shortage of military optical instruments, such as range-finders and telescopic sights. This has now been remedied, and the National Research Council's own shop can produce any kind of precise optical part. Other precise physical instruments developed in Canada include an electrical plotting device for sound range finding and a chronometer for measuring muzzle velocities of artillery shells.

Work on improvement in aircraft ranges from tests of plastics used in making accessory parts and bonding fabric and plywood wing materials to investigation of improved light armor and anti-icing devices for propellers. Many improvements have been made in engines and landing gear, especially in the adaptation of skis and floats for use in far northern patrol areas.

National Research Council psychologists and medical scientists have conducted extensive investigations into the best testing method for selecting personnel, again especially for the flying service. They have been concerned with problems in oxygen requirement, "blackouts" of pilots in steep dives or rapid spins, and rapidity of mental-muscular coordination in situations requiring split-second reactions for success in combat and safety in handling and landing planes.

Feeding of troops and civilian population has presented many important problems. The Council's division of biology and agriculture cooperated in the preparation of the new ration schedule for the troops, and also worked with the medical division on the study of proper cold storage methods to use in blood banks.

Changes in the smoking, shipping and storing of the famed Canadian bacon make it possible to extend the time of its use from less than forty days to at least seventy—a matter of considerable practical importance in victualling troops now in England and on the Mediterranean fronts.

*Science News Letter, January 25, 1941*

## ● Earth Trembles

**Information collected by Science Service from seismological observatories resulted in the location by the *U. S. Coast and Geodetic Survey* of the following preliminary epicenter:**

***Sunday, Jan. 5, 1:46.7 p.m., EST***

**in the region of Flores Island, east of Java and south of Celebes. Latitude, 9 degrees south. Longitude, 121 degrees east.**

***Monday, Jan. 13, 11:27.7 a.m., EST***

**North on New Guinea. Latitude, 3 degrees south. Longitude, 144 degrees east. Severe shock.**

**For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see *SNL*, Feb. 24, 1940.**


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ECONOMICS

# Increase in Output Would Lower Unit Cost of Steel

## Economists of U. S. Department of Agriculture Declare More Knowledge of Cost Functions Essential

WHETHER the steel industry, which reaches flexible fingers into many other industries, can step up its output in time with defense tempo and at the same time reduce its cost of manufacture, is a vital problem.

Some economists hold that the cost of making a ton of steel is practically the same whether the plant is running at 80% capacity or at only 50%, the American Statistical Association has learned from reports presented at their annual meeting in Chicago.

Analysis of records kept by the United States Steel Corporation indicated to Dr. Mordecai Ezekiel and Miss Kathryn Wylie, economists of the U. S. Department of Agriculture, however, that stepping up production from 50% to 80% of capacity actually decreases the unit cost of production about 17% to 10%.

Labor costs per ton of steel decrease materially as the output is increased, Miss Wylie told the statisticians. When a plant is operating at only 20% of its capacity, it takes 56 man-hours of labor to make a ton of steel. If the output could be stepped up to full capacity, the labor per ton would amount to only 32 man-hours.

Output per additional man-hour, she said, is about three times as great at 90% capacity as it is when the plant slows down to only 40% capacity.

"If this relation is found to hold true," she said, "in other mass-production industries such as automobiles, cement, aluminum, etc., material revisions may be required in much of current economic theory to make its assumptions consistent with the facts of a major part of modern industry."

"Our defense planning," Dr. Ezekiel and Miss Wylie conclude, "requires such information about our major industries that it may be most effective. Since steel is one of the major raw materials of defense, knowledge of the cost functions in that industry is particularly important.

"The prices which the government will pay for steel might be directly related to costs at different levels of output. Excessive profits might easily result from inadequate knowledge of these relations. On the other hand, the industry might be adversely affected by the adoption of an unduly low price structure without adequate knowledge of these relations."

The steel industry is in a peculiar position in regard to the balance of increased purchasing and lowered prices, Dr. W. Gregg Lewis, of the University of Chicago, told the meeting.

The railroads as large purchasers of steel were cited by Dr. Lewis as an example of this dislocation. Since the railroads do not sell steel products but services, he explained, the amount of their purchases depends upon the amount of travel or shipping and not upon the price of steel.

The question was raised by Dr. Lewis, however, as to whether the timing of railroad purchases might not be adjusted to periods of low steel prices, regardless of the fact that amount of purchase is independent of the price to be paid.

"There is practically no evidence in the historical record that the railroads have followed such a policy," he declared. "The decisions required are apparently longer run than the railroads have been willing to make. When traffic and income are low, replacement pressure is also low. The short-run policy of postponing replacements is followed. When traffic is high, replacements become necessary almost without regard to price."

In fact, he said, there is in general a perverse tendency in steel buying. Price advances generate expectations of further price advances and cause increases in purchasing and over-accumulation of inventories. Price declines have an opposite effect.

*Science News Letter, January 25, 1941*

CHEMISTRY

## Wood Can Be Converted Into Easily Bent Plastic

WOOD can be converted into an easily bent and molded plastic by a new process developed at the U. S. Forest Products Laboratory. Worked into any desired shape while hot, the plasticized wood becomes as stiff and strong as ever upon cooling.

The new treatment is a by-product of the Laboratory's research on the chemical seasoning of refractory woods. During the experiments it was found that oak, soaked in a concentrated solution of urea and then dried, became plastic when heated to about the boiling point of water, though the wood was still dry. It remained plastic while hot, and resumed its normal "woodenness" upon cooling.

Sawdust and chips, similarly treated, can be heated and pressed into any desired shape. This material is self-bonding, that is, it sticks together without the addition of any outside adhesive.

Thus far, the new process has been used principally on hardwoods, particularly several species of oak. However, preliminary experiments indicate that softwoods like juniper and Sitka spruce will also give good results under the same treatment.

Patents covering the new process have been applied for by the Forest Products Laboratory.

*Science News Letter, January 25, 1941*

*Chemical substances* of the human body—proteins, fats, and carbohydrates—are constantly changing with rapidity hitherto undreamed of, says a biochemist.

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CONSERVATION

## NATURE RAMBLINGS
*by Frank Thone*

### Patchwork Forests Best

WILD animals that live in the woods don't like their woods too complete. Not the "deep tangled wildwood" of oldtime poetic fancy, but a mixture of old and young trees, full-grown timber and open spaces with plenty of brush, makes up the ideal forest from the wildlife standpoint, Ira N. Gabrielson, chief of the U. S. Fish and Wildlife Service, points out in a new book, *Wildlife Conservation* (*Reviewed, SNL, this issue*).

This seeming paradox is easy to explain. Tall trees in completely closed ranks, such as one finds in a mature virgin forest, bear their leafy canopy high in air, where not even a giraffe, let alone a deer or moose, can browse on the foliage. Furthermore, the tops are so tightly interlaced that very little light can seep through to support a ground population of herbs and shrubs that would afford food to game.

The ideal situation, where profitable timber yield and support of wildlife are sought simultaneously, can be achieved either by selective cutting, where only chosen trees, ripe for the ax, are taken out each year, or by clean cutting of quite small blocks of timber distributed through the forest. Either method provides a constant succession of well scattered spots where young trees and underbrush provide browse and shelter. The Forest Service even instructs its men not to plant in certain limited acreages that appear to be more useful as homes for wildlife than as fields for timber.

Mr. Gabrielson of course does not confine his attention to problems of wildlife in the forest. His book is a comprehensive and well-balanced study of what is to be done with America's outdoor resources—grasslands, deserts, mountains, streams and lakes, as well as woods. He reviews abuses of the past, and tells how they can best be remedied—are already being remedied in many places.

It isn't just a matter of providing picnic grounds for vacationers, game to hunt and fish to catch for sportsmen. There are potential cold cash values of major proportions in wildlife restoration. The raw fur take in the United States was once worth a hundred million dollars a year. What the meat might have been worth, in the days of game abundance, there is no way of estimating. But if we could restore even a fraction of the venison and wildfowl and fish that the early settlers knew—and wasted—there can be no doubt that there would be eager and profitable markets for them.

*Science News Letter, January 25, 1941*

ARCHAEOLOGY

# Oldest Home in East Found In Blue Ridge Mountains

THE OLDEST known home in eastern United States, an "ideal" camp site occupied by American tenants probably 10,000 years ago, has been discovered in the Blue Ridge Mountains of Virginia by David I. Bushnell, Jr., Smithsonian Institution archaeologist.

Indicating extreme age of the aboriginal home are two Folsom dart points, clues to presence of America's very ancient big game Folsom hunters, who roamed the wilderness near the end of the Ice Age. These two points have been picked out of debris of the Virginia camp. That the place may have been a Folsom hunters' workshop is inferred from finding other man-made tools in the debris, some resembling Folsom work, and also from finding many small flakes of the same stone as the points.

Workmen engaged on picturesque Skyline Drive in Shenandoah National Park attracted attention to the important site, when they struck Indian relics in their digging. Mr. Bushnell, called to investigate, found and expertly sorted out a mixture of objects obviously left by prehistoric tenants of different cultures.

When North America was being settled by Europeans, the Cherokee and Siouan Indians had a village at the desirable site, which is in a mountain valley overlooking lofty Peaks of Otter. Far older than these Indians, revealed by artifacts at the site, were mysterious "Round Grave People," whom archaeologists in Kentucky have called the oldest inhabitants ever detected there.

Folsom Men in the West, named from the place in New Mexico where their distinctive, grooved, stone weapon points first came to light, are assigned an antiquity of at least 20,000 years by some geologists. In the East, antiquity of weapons is not yet determined, because Folsom points found in the East have been solitary objects dropped by some hunter.

The Virginia camp site, which is to be studied intensively by Mr. Bushnell and Dr. Frank H. H. Roberts, Jr., of the Smithsonian staff, may yield the long hoped for evidence of Folsom points buried under layers of earth which would give geologists a clue to their eastern age.

*Science News Letter, January 25, 1941*

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# •First Glances at New Books

BIOGRAPHY—MEDICINE

WHO WALK ALONE—Perry Burgess—*Holt,* 308 p., $2.75. A stirring, vivid story about leprosy in which there is drama, tragedy, accurate firsthand accounts of life in the leper colony of Culion but very little that is gruesome. The author is president of the Leonard Wood Memorial (American Leprosy Foundation) and knows both the conditions and the persons of whom he writes.

*Science News Letter, January 25, 1941*

PHARMACY

HISTORY OF PHARMACY, A Guide and Survey — Edward Kremers and George Urdang—*Lippincott,* 466 p., pl., $5. See p. 53.

*Science News Letter, January 25, 1941*

ANTHROPOLOGY

THE PUYALLUP-NISQUALLY — Marian W. Smith—*Columbia Univ. Press,* 336 p., $5. An anthropological study of the Coast Salish Indians of southern Puget Sound, Washington. The life described, through the memories of the oldest Indians alive in this region, has vanished "before their eyes."

*Science News Letter, January 25, 1941*

PHYSIOLOGY

THE ORIENTATION OF ANIMALS, Kineses, Taxes and Compass Reactions — Gottfried S. Fraenkel and Donald L. Gunn—*Oxford Univ. Press,* 352 p., illus., $6. Responses of animals to stimuli which determine their position and direction of movement are taken up in order and treated in considerable detail. Since no other book now in print is devoted exclusively to this subject, zoologists and physiologists will find this volume invaluable as a ready, compact reference work.

*Science News Letter, January 25, 1941*

CONSERVATION

WILDLIFE CONSERVATION—Ira N. Gabrielson—*Macmillan,* 250 p., illus., $3.50. See page 63.

*Science News Letter, January 25, 1941*

ECONOMICS

TEN YEARS OF INTEGRAL LAND-RECLAMATION UNDER THE MUSSOLINI ACT—Giuseppe Tassinari—*Italian Lib. of Information,* 165 p., map., $1.50. A little book of apparently well-justified boasting over the accomplishments of Il Duce's regime in reclaiming marshes, eroded lands and other seemingly hopeless areas in Italy for good agriculture and healthy living. Peace, for Fascismo, had victories much more renowned than those of war!

*Science News Letter, January 25, 1941*

PHOTOGRAPHY

THE AMERICAN ANNUAL OF PHOTOGRAPHY, 1941 (Vol. 45)—Frank R. Fraprie and Franklin I. Jordan, eds.—*American Photographic Pub. Co.,* 276 p., illus., pl., $1.50 paper, $2.25 cloth. The pictorial illustrations are selected from the artistic viewpoint, while the articles cover many phases of photography. This book includes the "Who's Who in Pictorial Photography."

*Science News Letter, January 25, 1941*

ENGINEERING

THE AXIAL ADJUSTMENT OF DEEPWELL TURBINE PUMPS—Morrough P. O'Brien and Richard G. Folsom—*Univ. of Calif.,* 25 p., 25c.

*Science News Letter, January 25, 1941*

NAVIGATION

SIMPLIFIED CELESTIAL NAVIGATION — P. V. H. Weems and E. A. Link, Jr.—*Weems System of Navigation,* 92 p., $3. The work of Commander Weems has done much to simplify methods of navigation by observation of the celestial bodies, so that "anyone who can read and write, and add two and two, can learn it easily." This is especially important in trans-ocean flying, where speed makes mandatory the most rapid solution of navigational problems.

*Science News Letter, January 25, 1941*

AGRICULTURE

REPORT OF THE SECRETARY OF AGRICULTURE, 1940—*Govt. Printing Off.,* 184 p., 15c. See page 60.

*Science News Letter, January 25, 1941*

PUBLICITY

SPEAK UP FOR DEMOCRACY—Edward L. Bernays—*Viking Press,* 127 p., $1. A handbook on propaganda for militant Americanism written by an expert. Plenty of hints here on publicity for any cause if you want to use them.

*Science News Letter, January 25, 1941*

HERPETOLOGY

A BIOGEOGRAPHICAL STUDY OF THE ORDINOIDES ARTENKREIS OF GARTER SNAKES (GENUS THAMNOPHIS)—Henry S. Fitch—*Univ. of Calif. Press,* 133 p., 7 pl., $1.50. A study of interest only to systematic herpetologists and zoogeographers; but of more-than-ordinary interest to them.

*Science News Letter, January 25, 1941*

NUTRITION

ESSENTIALS OF NUTRITION—Henry C Sherman and Caroline Sherman Lanford —*Macmillan,* 418 p., illus., $3.50. Written as a text for beginning students of nutrition, this book is yet simple enough to be understood by the lay reader without scientific training. Valuable to both lay readers and students are the up-to-date and practical aspects of the book.

*Science News Letter, January 25, 1941*

ENGINEERING

LOCOMOTIVES ON PARADE — Edward Hungerford — *Crowell,* 236 p., illus., $2.50. Known for his presentation of the famous "Fair of the Iron Horse" in 1927, as well as for the railroad pageants at both the Chicago and New York World's Fairs, Mr. Hungerford is an outstanding authority of railroad history. In this book he relates the enthralling story of the development of locomotives, from the little seven-ton Stourbridge Lion, which ran over a three-mile track in 1829, to the streamlined giants of today.

*Science News Letter, January 25, 1941*

ELECTRICAL ENGINEERING

MEN AND VOLTS, The Story of General Electric—John Winthrop Hammond—*Lippincott,* 436 p., illus., $2.50. To a great extent, the story of the development of electrical industry in the United States has been the story of the General Electric Co. That fascinating story is here told by an author who had the good fortune, before his death in 1934, of being able to check with the original records and with the very men of whom he wrote. An Epilogue covers the events of recent years, and, as an appendix, Mr. Owen D. Young's statement to the Temporary National Economic Committee in 1939 is included.

*Science News Letter, January 25, 1941*

MEDICINE

HOW TO PREVENT GOITER—Israel Bram —*Dutton,* 182 p., $2. Dr. Bram explains simply and clearly what a goiter is, the different kinds of goiter, how they are treated and measures for prevention.

*Science News Letter, January 25, 1941*

ARCHAEOLOGY

EVIDENCE OF EARLY INDIAN OCCUPANCY NEAR THE PEAKS OF OTTER, BEDFORD COUNTY, VIRGINIA — David I Bushnell —*Smithsonian Inst.,* 14 p., illus., plates, 20c. See page 63.

*Science News Letter, January 25, 1941*